Follow this guide to build your sail car body & masts, which you can use to complete labs and engineering challenges!

Sail car bodies should be built with adult assistance and supervision. Once built, the cars can be reused year after year while kids design and test new sails!
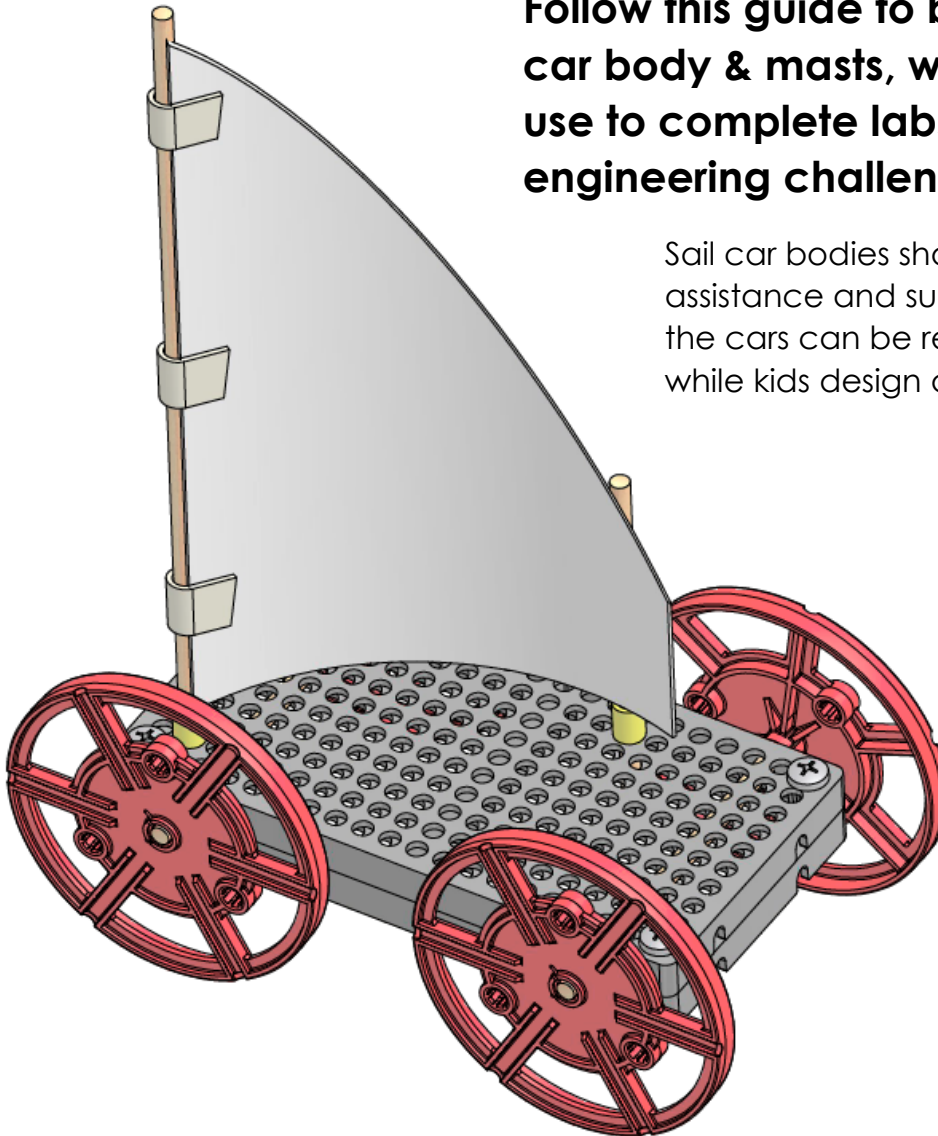
You Are Here

Choose how you would like to complete this activity.
Download documents & videos at teachergeek.com/sailcar

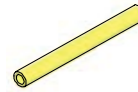| Go Guide	Optional Labs			Optional Challenge
Start here to build your sail car and set up for the Tailwind Challenge!	**Pre-K** -Push Pull -Wind	**Gr: K-1** -Push Pull -Wind	**Gr: 2-3** -Wind -Balanced Forces	-Crosswind Challenge

Check out our build video and immersive challenge videos by scanning the QR Code or going to **teachergeek.com/sailcar**

SAILCAR COMPONENTS

Here are the TeacherGeek components you'll need to make each Sail Car.

The advanced version of this activity contains extra components so you can make more creative designs!
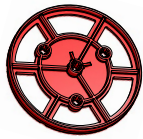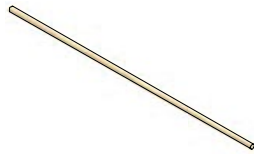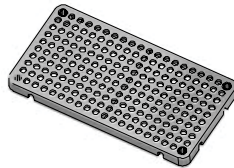
4 Wheels | **3 Dowels** | **2 Hole Plates** | **Slide Stop**
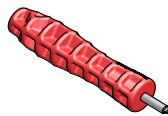2 cm (3/4 in) | **4 Screws**
(1in #10 Screws)

TEACHERGEEK TOOLS

These are the tools you will need for the Sail Car Body Build.

You will not need them for the Labs or Engineering Challenges. These tools are part of the TeacherGeek Maker Cart, or are available at **teachergeek.com**.

Multi-Cutter
SKU 1823-81
Or anything else that can cut dowels & slide stop

Reamer
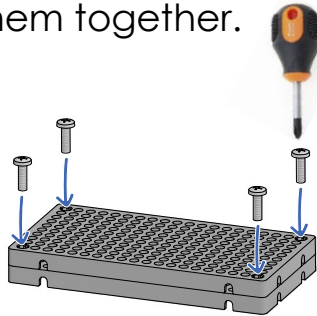SKU 1823-87

Phillips Screwdriver
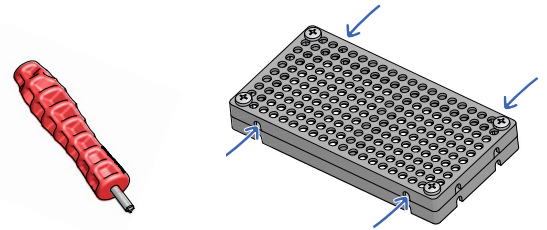SKU 1823-90

Hammer (optional)
SKU 1824-41

Caution: Tools are to be used by ages 12+, or with close adult supervision.

BUILD THE BODY

1 Stack two **hole plates** on top of each other. Use four **screws** to attach them together.

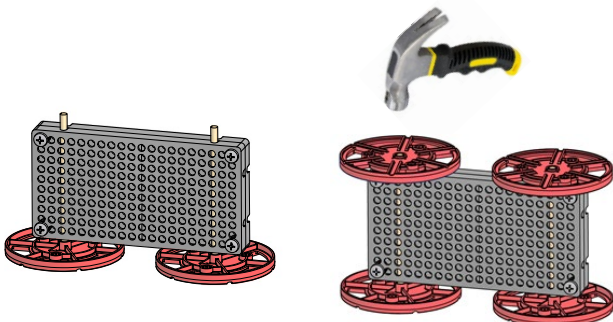**2** **Ream** the 4 holes that were created by attaching the two **hole plates**.

3 **Cut** two 11 cm (4.25 in) sections from one **dowel**. These will be your wheel axles.
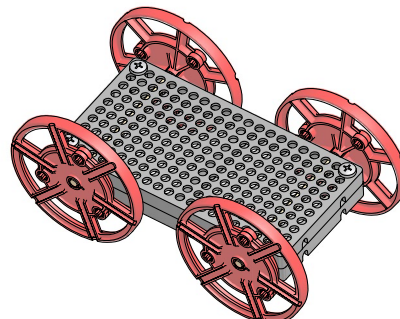
11cm Long

4 Wiggle or tap the **dowels** from Step #3 into **wheels**.

5 Slide the **wheels** with **dowels** from Step #4 into the reamed **hole plate** holes. Then wiggle or tap on two more **wheels**.

6 **Your sail car body is done!** You can optionally use the body for the Push Pull Lab, but we recommend you continue on to make the masts first.
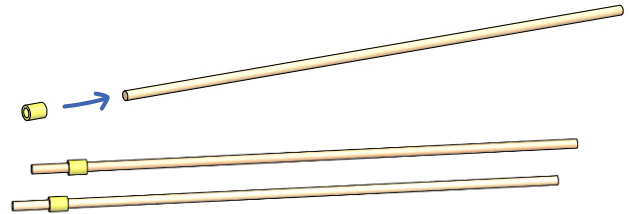
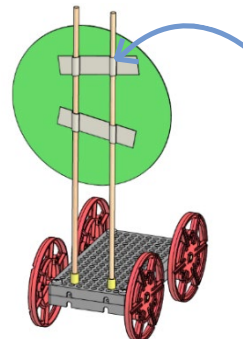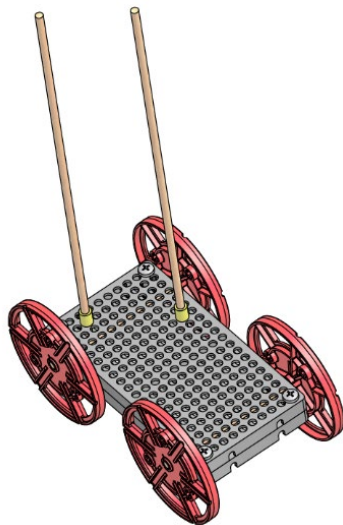Download the Push/Pull Lab at **teachergeek.com/sailcar**

MAKE THE MASTS

7 Cut two 1 cm (3/8 in) sections of **slide stop**.

8 Place each **slide stop** section approximately 2 cm (3/4 in) onto an uncut **dowel**.

9 Place the masts into the Sail Car body. The masts will be used to attach the sails.

To finish the sail car, have kids tape their own sail to the masts. Use paper, card stock, recycling bin materials… there are endless sail options!

10 Now that your body and masts are done, it's time for labs and/or challenges! Complete one of the optional labs below or continue on to set up for the engineering challenge!

Optional Labs:

Pre-K	Grades: K-1	Grades: 2-3
-Push Pull -Wind	-Push Pull -Wind	-Wind -Balanced Forces

Download these labs at
teachergeek.com/sailcar

TAILWIND CHALLENGE

How far can you make your sail car go?

Follow the instructions below to set up your track. Then have kids design and refine sails for their cars, seeing whose sail can go the farthest! Kids can optionally track their progress with Engineering Notebooks.

Check out our immersive challenge videos by scanning the QR Code or going to **teachergeek.com/sailcar**
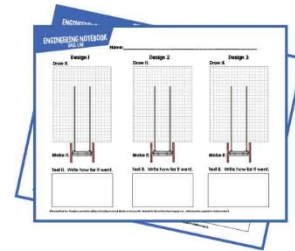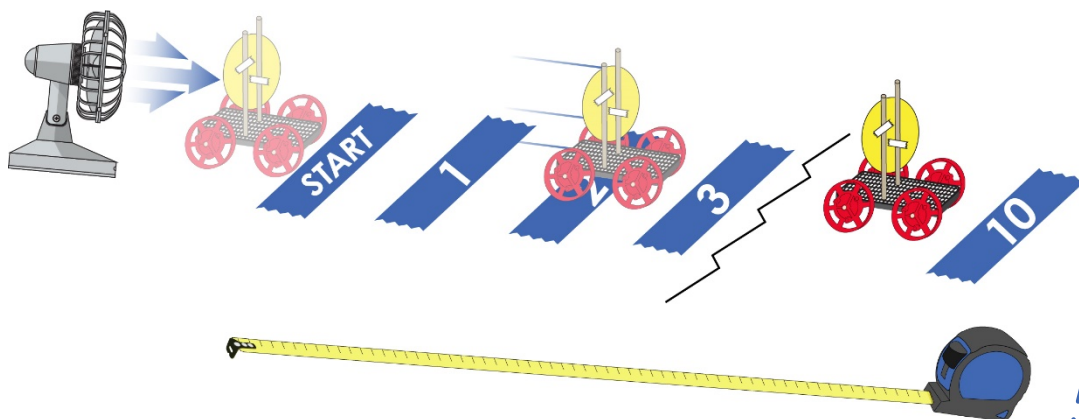
Get Engineering Notebooks for **Pre-K** or **Grades K – 3** at **teachergeek.com/sailcar**

Track Setup

Set up your track in an area 10 m (30 ft) long by 2 m (6 ft) wide, with the fan behind the start line. Uncarpeted areas are preferred.

Option 1: Place numbered pieces of tape every meter (3 ft). Students will use these to measure how far their sail car travelled.

START   1   3   10

Option 2: Have students use a measuring tape, meter stick, etc. to measure the distance their sail cars travel.
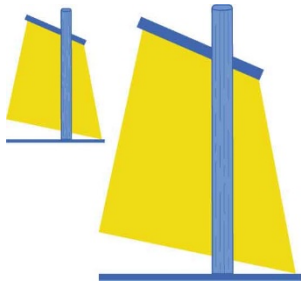
Optionally increase the challenge by having students carry weights/passengers.
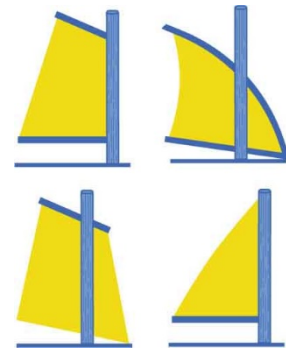
CHANGE THE DESIGN!

Sail Size
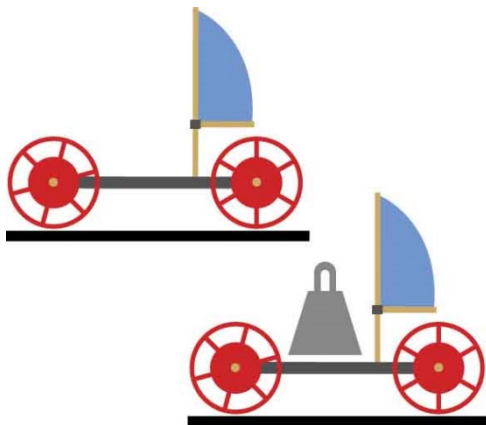Will a bigger or smaller sail make your car go farther?

Sail Shape
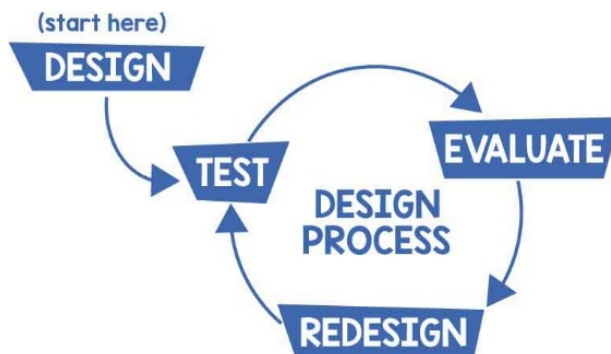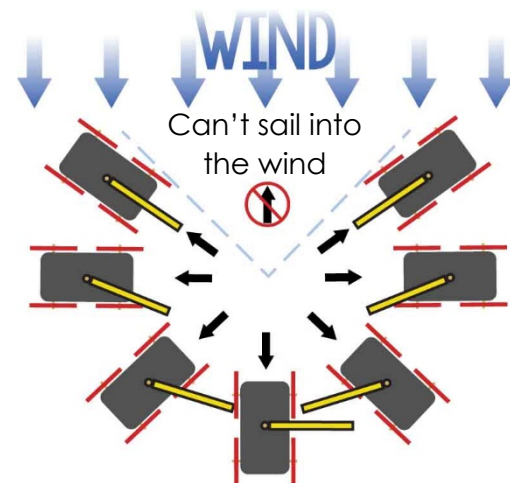Try different shapes to see which works best!

Mass
Does a heavy or light car go the farthest?

Sail Angle
If the wind isn't coming from behind your car, change the angle of the sail!

WIND

Can't sail into the wind

(start here)
DESIGN

TEST

EVALUATE

DESIGN PROCESS

REDESIGN

The Design Process never ends! There is no perfect design.